

## REMARKS

The last Office Action of November 1, 2006 has been carefully considered. Reconsideration of the instant application in view of the foregoing amendments and the following remarks is respectfully requested.

Claims 1-10 are pending in the application. No amendment to the claims and specification has been made.

### **Claim Rejections under 35 U.S.C. §112**

The rejection of claims 1-10 under 35 U.S.C. §112, second paragraph, is hereby traversed.

1) The examiner rejected "in the event of" as lacking antecedent basis. In the English language, the term "in the event of" is an alternate expression for "if" and does not require antecedent basis. It does not refer to a specific event. This rejection is unreasonable and absurd, and the USPTO has granted 37,568 patents with the qualifier "in the event of" for "if" in the claims.

2) The phrase "so as to" does not render the claim indefinite. Again, the commonly accepted meaning of "so as to" in the English language expresses a consequence of an action. Claims 9 and 10 could alternatively have been drafted to read "thereby short-circuiting" instead of "so as to short-circuit." Moreover,

"If the language of the claim is such that a person of ordinary skill in the art could not interpret the metes and bounds of the claim so as to understand how to avoid infringement, a rejection of the claim under 35 U.S.C. 112, second paragraph, would be appropriate. See *Morton Int'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470, 28 USPQ2d 1190, 1195 (Fed. Cir. 1993). However, if the language used by applicant satisfies the statutory requirements of 35 U.S.C. 112, second paragraph, but the examiner merely wants the applicant to improve the clarity or precision of the language used, the claim must not be rejected under 35 U.S.C. 112, second paragraph, rather, the examiner should suggest improved

language to the applicant." (MPEP 2173.02)

It appears that the examiner deviates in her interpretation of the English-language sentence structure from commonly accepted meanings. The rejection contravenes the examiner's examination guidelines under MPEP 2173.02, and withdrawal of this rejection is requested.

### **Claim Rejections under 35 U.S.C. §103**

Claims 1-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mori (US 5,333,706) in view of Yamada et al. (US 6,213,571) and further in view of Shin et al. (US 6,531,839).

This rejection is hereby respectfully traversed for the following reasons.

The present invention, as recited in claim 1, is directed to a drive control system for braking an electric motor, with an integrated armature short-circuit brake having a first delay time, a mechanical brake having a second delay time which is longer than the first delay time, and a controller simultaneously applying a control signal to the integrated armature short-circuit brake and the mechanical brake at an activation time for immediately stopping the electric motor in the event of a malfunction which prevents a controlled slow-down of the electric motor. The armature short-circuit brake is disengaged when a thermal load limit for the electric motor or the controller has been reached.

Claim 6 recites a corresponding method for instantaneously stopping an electric motor powered by a drive system in the event of a malfunction which prevents a controlled slowdown of the electric motor. The method includes the steps of detecting the malfunction, simultaneously applying at an activation time a control signal to an integrated armature short-circuit brake and a mechanical brake, and disengaging the armature short-circuit brake when the electric motor or its control electronics reach a thermal load limit.

Mori discloses a brake apparatus for a vehicle, whereby for achieving a rapid braking action, the disk brake and the electromagnetic brake are activated

simultaneously. (Col. 2, line 16-27 and col. 4, line 60-68). The examiner asserts that Mori disengages the electromagnetic brake when a certain load limit is reached, citing col. 5, lines 11-15: "In STEP 206, when the vehicle speed is equal to or lower than the threshold speed value, the control circuit 12 only outputs a power signal to caliper 16, and therefore only the disc brake (electric actuator 8) is actuated (STEP 209)." Evidently, Mori detects a speed value and not a load limit.

In the section on page 4 of the office action titled "Response to Arguments" the examiner repeats the misguided reasoning from the previous office action. Moreover, the examiner makes confusing statements by asserting that (a) Mori does not teach "disengaging the short circuit brake when the thermal load limit is reached" (page 3, lines 8 and 9 of the final office action; also on page 4 of the first office action, 4<sup>th</sup> line from bottom); and by then arguing on page 4, lines 4-5 of paragraph 5, that (b) Mori teaches that "the power to the motor is based on speed and that when the speed reaches a lower limit, the short-circuit brake is deactivated." The examiner then asserts that the "thermal load limit" may be a minimum and not necessarily a maximum.

The examiner's interpretation again contravenes the commonly accepted meaning of the English term "load limit." The term "load limit" is commonly used to express a maximum (and not a lesser load) that can be applied to a system or a component of the system. A definition can be found, for example, in the McGraw-Hill Dictionary of Scientific and Technical Terms, 5th edition, page 1158. A copy of this page is attached to this submission. The dictionary definition states:

**load limit** [CIV ENG] the maximum weight that can be supported by a structure. {MECH ENG} The maximum recommended or permitted overall weight of container or a cargo-carrying vehicle that is determined by combining the weight of the empty container or vehicle with the weight of the load.

Mori therefore does not teach disengaging the armature short circuit brake when a (maximum) thermal load limit is reached, as recited in claim 1. Mori's failure to disclose a (maximum) thermal load limit has been explicitly admitted in

the office action (page 3, lines 7-8), as discussed *supra*. In fact, Mori explicitly states (col. 4, lines 7-19) that "when the vehicle speed decreases below a predetermined value during brake operation, the control circuit 12, which receives a detection signal from the vehicle speed sensor 15, energizes caliper actuator 8 such that only the disc brake (or drum brake) is actuated to produce a brake operation." (Emphasis added).

The office action then asserts that Yamada teaches disengaging the short-circuit brake when a thermal load limit for the electric motor or the controller has been reached. We have previously argued and maintain our position that Yamada does not disclose, teach or suggest anything resembling a thermal load limit for a short-circuit brake.

Yamada discloses a control apparatus for an electric vehicle with an emphasis on achieving a smooth transition between regenerative braking and "plugging" braking. The term "plugging" braking, as it is known in the art, refers to an electric braking operation wherein an electric current is supplied to the motor/generator. Col. 1, lines 56-65, as cited by the examiner, refer to a method, which ensures operation of the control apparatus for electric vehicle to be maintained even if a contact voltage of the regenerative contactor cannot be detected due to failure of its wiring or the like. Yamada detects the absence of a contact voltage of the regenerative contactor during regenerative braking, but does not detect of a thermal load limit.

Shin describes braking a motor with a mechanical brake and an electrical brake, wherein the rotation speed of the motor is first reduced by using a mechanical brake method, whereafter when the rotation speed of the motor drops below a predetermined speed, the motor is stopped using an electrical brake method. Unlike the present invention, which disengages the electromagnetic (short-circuit armature) brake when a thermal load limit is reached, Shin uses the mechanical brake method during the high speed rotation interval to prevent heat occurrence (but does not detect a thermal load limit), and thereafter uses the electrical brake method during the relatively low speed interval so that the motor

can be stopped within a short time. (See Shin's Abstract) While Applicant admits that Shin discloses the various delay times for mechanical and electromagnetic braking, Shin does not disclose a thermal load limit for a short-circuit brake.

The examiner further argues that Applicant applied the arguments against the references individually. This cannot be further from the truth, since at least the limitation recited in claim 1 that "the armature short-circuit brake is disengaged when a thermal load limit for the electric motor or the controller has been reached" is absent from the combination of the references.

The criteria for establishing a *prima facie* case of obviousness are detailed in MPEP 2142-2143. Pursuant to MPEP 2142, "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)."

Applicant contends that the cited references fail to satisfy the criteria for a *prima facie* case of obviousness. Specifically, Applicant contends that the cited references fail to teach or suggest at least that the "the armature short-circuit brake is disengaged when a thermal load limit for the electric motor or the controller has been reached". Because the combination of references fails to teach or suggest each and every limitation of the claimed invention, the cited references fail to undermine the patentability of the claimed invention.

As to motivation to combine, the Office Action suggests that it would have been obvious to modify the apparatus taught in Mori and Yamada by incorporating the delay times taught by Shin to safely control the braking of the motor, because

power is based on the speed and that mechanical braking has a longer delay than short-circuit braking.

However, these references are not properly combinable. There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998).

Mori teaches disengaging the electromagnetic brake when a lower speed limit has been reached. There is no teaching in Mori to detect a thermal load limit. Motor speed has no relationship whatsoever to a thermal load limit, which refers to a maximum thermal load from short-circuit armature braking, as discussed *supra*. Yamada's braking method operates by entirely different principles, namely by switching from regenerative braking to "plugging" braking. Instead of detecting a thermal load limit, Yamada detects the absence of a contact voltage of the regenerative contactor during regenerative braking. A person skilled in the relevant art would therefore not be motivated to combine Mori and Yamada to solve a problem resulting from a (maximum) thermal load limit of a motor or motor controller during braking with a short-circuit armature, and the combination would also fail to teach or suggest disengaging the armature short-circuit brake when a thermal load limit for the electric motor or the controller has been reached.

There would also be no motivation to combine Shin with Mori and Yamada to solve the problem resulting from a (maximum) thermal load limit of a motor or motor controller during braking with a short-circuit armature, since Shin uses electrical braking at low speed where a maximum thermal load on the electrical brake is not an issue. Moreover, Shin's braking process is performed in the reverse order of the present process, as Shin disengages the mechanical brake when a load limit for the mechanical brake has been reached. Shin, when combined with Mori and Yamada, would therefore not contribute to a solution of the problem resulting from a (maximum) thermal load limit of a motor or motor controller during braking with a short-circuit armature, and the combination would

also fail to teach or suggest disengaging the armature short-circuit brake when a thermal load limit for the electric motor or the controller has been reached.

Thus, these references, whether taken singly or in combination, fail to teach all the elements of claims 1 and 6. Accordingly, the proposed combination cannot render the claimed invention obvious.

Applicant therefore submits that claims 1 and 5 are patentable over the cited US Patents to Mori, Yamada and Shin, as these references, when taken either alone or in combination, fail to teach or suggest the limitations recited in claims 1 and 5. Claims 2-4, which depend from claim 1, and claims 6-10, which depend from claim 5, are then also patentable for at least the reasons that claims 1 and 5 are patentable. Withdrawal of the finality of the rejections and allowance of the pending claims is therefore respectfully requested.

### CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in immediate conditions for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Respectfully submitted,

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